

# PATENT SPECIFICATION (11)

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H2E EGC

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## (54) ELECTRICAL CONNECTOR FOR MOTOR WINDINGS

- (71) We, SHELL ELECTRIC MANUFACTURING Co. LTD., a Company Incorporated in Hong Kong, of Shell Industrial Building, Lee Chung Street, Chai Wan, Hong Kong, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—
- 10 The present invention relates to motors and electrical connectors therefor, and is particularly, although not exclusively, concerned with a.c. motors of the type having the armature wound on a multi-pole central stator, for example as often used for electric fans.
- 15 Such a.c. motors have a plurality of armature windings on the stator and these must be connected to each other and to external connecting leads. Conventionally this is achieved by joining the wires, e.g. by soldering, an insulating sleeve being provided over each joint. In order to keep the sleeves in place the windings and joints are secured by binding with cord.
- 20 According to one aspect of the present invention there is provided an electrical connector for motor windings comprising an electrically insulating generally circular base member having radial slots for receiving, in each slot, two or more wires that are to be joined, an electrically insulating cover member having at least one projecting portion for, in use, holding the wires in the slots, and securing means for securing the members together.
- 25 Preferably each slot has a portion of V-shaped cross-section located such that when the members are secured together by the securing means the wires in each slot are urged by the or a said projecting portion toward the base of the slot.
- 30 In a preferred embodiment each slot has an open end for entry of the wires, the portion of the slot adjacent said end having a depth which decreases toward that end.
- 35 Preferably each slot has two sections separated by an open region and the projecting portion(s), in use extend(s) into the open regions, the open regions lying on a circle, the projecting portion(s) taking the form of a circumferentially extending skirt.
- 40 The base member may further include a plurality of recesses for receiving connections between wires of motor windings and external connecting leads, each recess having a V-shaped notch in which the wires may be held by the cover member and an aperture for receiving the external connecting leads.
- 45 The securing means may, if desired, comprise upstanding pegs on one member which engage with recesses or apertures in the other.
- 50 In another aspect the invention provides an electric motor comprising a rotor, a stator having a plurality of peripherally disposed armature windings and a centrally located connector of the type described above, interconnected pairs of wires from the windings being secured in respective slots of the connector.
- 55 The motor may form part of an electric fan, the rotor surrounding the stator and having a fan blade secured thereto.
- 60 One embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:
- 65 Figures 1, 2 and 3 are respectively top plan, underneath plan and perspective views of the base member of a connector according to an embodiment of the present invention;
- 70 Figures 4, 5 and 6 are respectively a side elevation, an underneath plan and perspective view of the cover member of the connector;
- 75 Figure 7 is a perspective view of the assembled connector; and
- 80 Figure 8 is a plan view of a motor stator including the connector with the cover member removed.
- 85 Referring to Figures 1, 2 and 3, the base member 1 of a connector is moulded from plastics material (which may be a thermoplastic—e.g. acrylic material or a thermosetting material such as a phenol formaldehyde resin) and has a generally circular flat
- 90
- 95

base portion 2 having a central cylindrical bore 3 which has six radially projecting axial ribs 4. Radiating from the core 3 are a plurality of pairs of radially extending fins 5, 6. The fins of each pair define therebetween a first, radially inner, section 7a of a wire-receiving slot. Each slot has a second, radially outer, section 7b, aligned with the first section. Each second section 7b is formed in a respective one of a plurality of upstanding pegs 8 which are arranged around the circumference of the base portion 2. The second section 7b of each slot has at its radially inner end, a portion 9 of V-shaped cross-section, whilst its (open) radially outer end decreases in depth toward that end (as indicated at 10) to provide a lead-in for wire entry.

The pegs 8 are radially spaced apart from the fins 5, 6, leaving a circumferentially extending open region 11.

Further fins 12 define three radially extending recesses 13 for external lead connections as will be described below. These recesses 13 are closed at their radially inner ends by the core 3 (which is at this point shortened to allow a passage 14 for entry of external leads) and at their radially outer ends by a wall 15 having three V-notches 16.

Also extending from the base portion 2 are six further upstanding pegs 17 for securing a cover member 18 (see Figures 4, 5 and 6).

The cover member 18 is a generally circular flat disc 19 having a chamfered top and a central aperture 20 and, extending from one face, a circumferentially extending skirt 21 which, in the assembled connector, extends into the open region 11 of the base member. The cover member also has a plurality of apertures 22 for receiving the pegs 8 and six further apertures 23 for receiving the pegs 17; these apertures 23 are of such a size that the pegs 17 are a tight fit therein. The cover member also has a radially extended portion 24 to extend over the recess 13.

An assembled connector is shown in Figure 7: as can be seen, the cover 18 is secured to the base member by means of the pegs 17 of the latter which extend through the apertures 23 of the former. The skirt 21 extends into the open region 11 whilst the radial extension 24 extends over the V-notches 16.

In Figure 8 is shown the stator of a single phase 18 pole capacitor type induction motor. Three external connecting leads 25, viz. supply, capacitor and common enter through the central aperture 20 of the cover member 15 and the aperture 14 into the three recesses 13 where they are secured, e.g. by soldering, to wires 26 extending from armature windings 27 of the motor. Wires 26 pass through the V-notches 16. The windings are connected in series and each pair of windings to be connected together has its wires 28 joined

and located in a respective slot 7a, 7b of the connector. When the cover member is fitted to the base member, the skirt 21 engages the pair of wires and grips them between the skirt and the base portion 2 of the base member, at the same time forcing the wires into the V-shaped portion 9 of the second slot portion 7b. The tapered portion 10 of the portion 7b provides a gradual lead-in for the wires.

The motor shown is of the type in which the rotor surrounds the stator. Such motors are suitable for use in electric fans, the fan blade being secured to the rotor.

#### WHAT WE CLAIM IS:—

1. An electrical connector for motor windings comprising an electrically insulating generally circular base member having radial slots for receiving, in each slot, two or more wires that are to be joined, an electrically insulating cover member having at least one projecting portion for, in use, holding the wires in the slots, and securing means for securing the members together.

2. A connector according to claim 1 in which each slot has a portion of V-shaped cross-section located such that when the members are secured together by the securing means the wires in each slot are urged by the or a said projecting portion toward the base of the slot.

3. A connector according to claim 1 or 2 in which each slot has an open end for entry of the wires, the portion of the slot adjacent said end having a depth which decreases toward that end.

4. A connector according to any one of the preceding claims in which each slot has two sections separated by an open region and the projecting portion(s), in use, extend(s) into the open regions.

5. A connector according to claim 4, in which the open regions lie on the circumference of a circle and the projecting portion(s) is/are in the form of a circumferentially extending skirt.

6. A connector according to claim 5 in which the radially outer section of each slot is formed in an upstanding peg and the cover member has a ring of apertures or recesses into which the pegs extend.

7. A connector according to any one of the preceding claims in which the base member has a plurality of recesses for receiving connections between wires of motor windings and external connecting leads, each recess having a V-shaped notch in which the wires may be held by the cover member and an aperture for receiving the external connecting leads.

8. A connector according to any one of the preceding claims in which the securing means comprises upstanding pegs on one member which, in use, tightly engage complementary recesses or apertures on the other member.

9. An electric motor having a rotor, a stator having a plurality of peripherally disposed armature windings and a centrally located connector according to any one of the preceding claims, interconnected pairs of wires from the windings being secured in respective slots of the connector.
- 5
10. An electric fan comprising a motor according to claim 9 in which the rotor surrounds the stator and is provided with a fan blade.
- 10

11. An electrical connector substantially as hereinbefore described with reference to the accompanying drawings.

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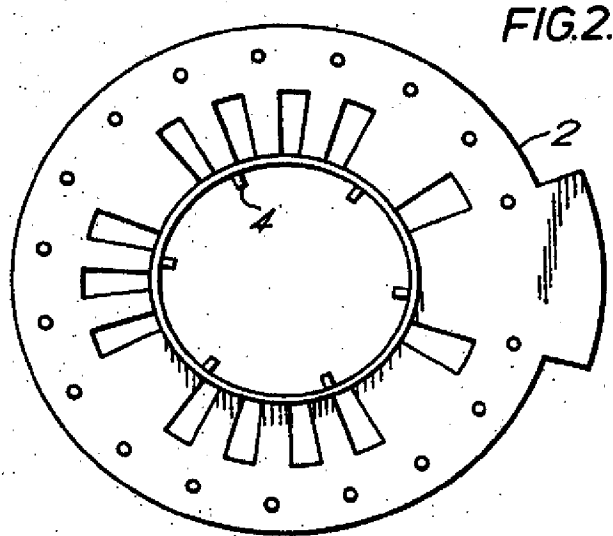
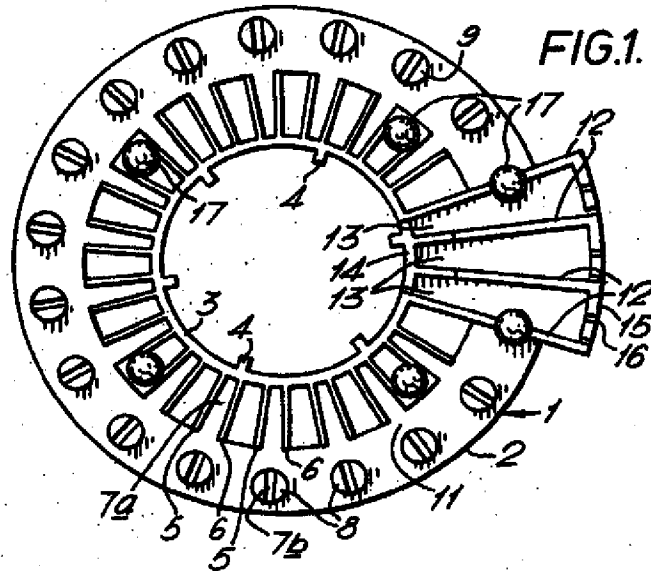
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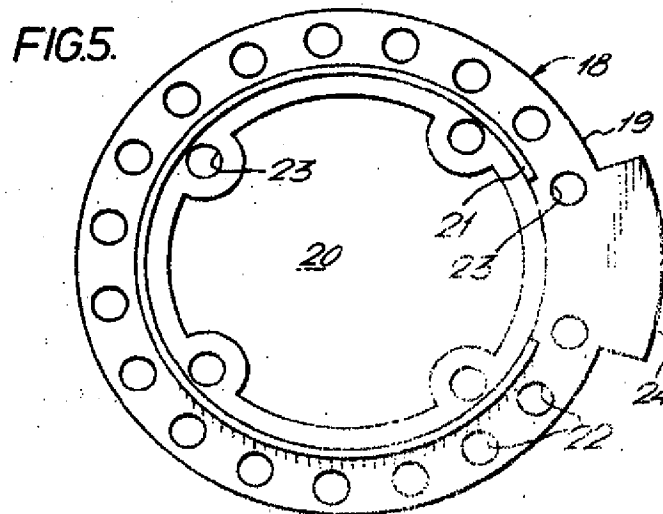
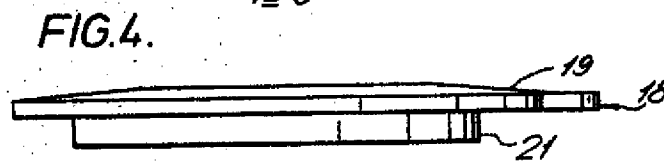
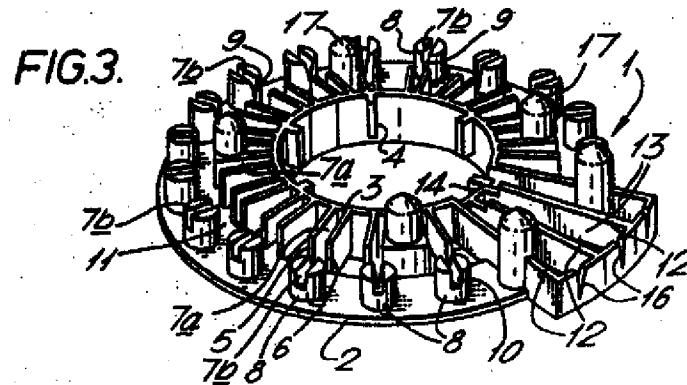
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COMPLETE SPECIFICATION

4 SHEETS

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the Original on a reduced scale  
Sheet 1





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FIG.6.

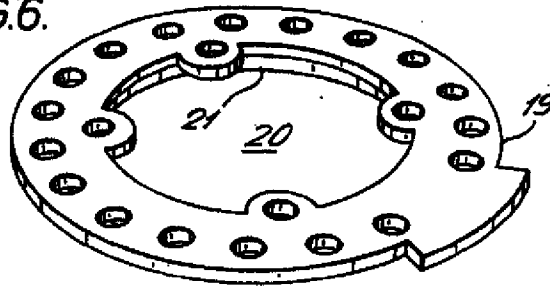
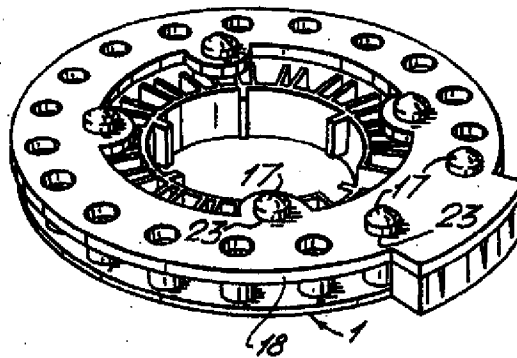


FIG.7.



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FIG.8.

